Application No. 10/763,268
Amendment dated February 1, 2007

Docket No.: 21581-00160-US3

After Allowance Under 37 C.F.R. 1.312

## AMENDMENTS TO THE CLAIMS

## 1-11 (Canceled)

12. (Currently amended) A vinyl polymer having a crosslinkable silyl group at at least one terminus of its main chain, which is prepared by adding a hydrosilane compound having a crosslinkable silyl group to a vinyl polymer having an alkenyl group of the following general formula (1) at at least one terminus of its main chain:

$$-CH_2-C(R^1)(R^2)-O-R^3-C(R^4)=CH_2$$
 (1)

wherein  $R^1$  and  $R^2$  are the same or different, and each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the production of a main chain of the polymer;  $R^3$  represents a divalent organic group having 1 to 20 carbon atoms and optionally containing one or more ether or ester bonds;  $R^4$  represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms. or an aralkyl group having 7 to 10 carbon atoms.

13. (Currently amended) A vinyl polymer having an alkenyl group of the following general formula (5) at at least one terminus of its main chain:

$$-CH_2-C(R^1)(R^2)-C(R^6)(R^7)-R^8-C(R^9)=CH_2$$
 (5)

wherein  $R^1$  and  $R^2$  are the same or different, and each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the production of a main chain of the polymer;  $R^6$  and  $R^7$  are the same or different, and each represents an electron-withdrawing group or one of them represents an electron-withdrawing group with the other representing hydrogen, an alkyl group having 1 to 10 carbon atoms, or phenyl;  $R^8$  represents a direct bond or a divalent organic group having 1 to 10 carbon atoms and optionally containing one or more ether bonds;  $R^9$  represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms.

14. (Original) The polymer according to Claim 13 wherein an electron-withdrawing group represents one group selected from the group consisting of

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 $-\text{CO}_2\text{R}$  (in which R represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, or an aralkyl group having 7 to 20 carbon atoms), -C(O)R (R represents the same as mentioned above), and -CN.

- 15. (Previously presented) The polymer according to Claim 13 wherein its main chain is prepared by polymerizing a (meth)acrylic acid type monomer.
- (Original) The polymer according to Claim 15 wherein the (meth)acrylic acid type monomer is an acrylic ester monomer.
- (Original) The polymer according to Claim 15 wherein the (meth)acrylic acid type monomer is a methacrylic ester monomer.
- 18. (Original) The polymer according to Claim 16 wherein the acrylic ester is butyl acrylate.
- 19. (Previously presented) The polymer according to Claim 13 wherein its main chain is prepared by polymerizing a styrene type monomer.
- (Previously presented) The polymer according to Claim 13, wherein a ratio (Mw/Mn) of
  its weight average molecular weight (Mw) to number average molecular weight (Mn) as
  determined by gel permeation chromatography is not over 1.8.
- (Previously presented) The polymer according to Claim 13, wherein its number average molecular weight ranges from 500 to 100000.
- 22. (Currently amended) A vinyl polymer having an crosslinkable silyl group of the following general formula (6) at at least one terminus of its main chain:

  -CH<sub>2</sub>-C(R<sup>1</sup>)(R<sup>2</sup>)-C(R<sup>6</sup>)(R<sup>7</sup>)-R<sup>8</sup>-CH(R<sup>9</sup>)-CH<sub>2</sub>-[Si(R<sup>10</sup>)<sub>2-b</sub>(Y)<sub>b</sub>O]m-Si(R<sup>11</sup>)<sub>3-a</sub>(Y)<sub>a</sub> (6) wherein R<sup>1</sup> and R<sup>2</sup> are the same or different, each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the

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production of a main chain of the polymer;  $R^6$  and  $R^7$  are the same or different, each represents an electron-withdrawing group or one of them represents an electron-withdrawing group with the other representing hydrogen, an alkyl group having 1 to 10 carbon atoms, or phenyl;  $R^8$  represents a direct bond or a divalent organic group having 1 to 10 carbon atoms and optionally containing one or more ether bonds;  $R^9$  represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms;  $R^{10}$  and  $R^{11}$  are the same or different, each represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an aralkyl group having 7 to 20 carbon atoms, or a triorganosiloxy group of the formula  $(R^1)_3$ SiO-  $(R^1)_3$ CiO-  $(R^2)_3$ CiO-  $(R^3)_3$ CiO-  $(R^3$ 

- 23. (Original) The polymer according to Claim 22 wherein the electron-withdrawing group represents one group selected from the group consisting of -CO<sub>2</sub>R (in which R represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, or an aralkyl group having 7 to 20 carbon atoms), -C(O)R (R represents the same as described above), and -CN.
- 24. (Previously presented) The polymer according to Claim 22 wherein its main chain is prepared by polymerizing a (meth)acrylic acid type monomer.
- (Original) The polymer according to Claim 24 wherein the (meth)acrylic acid type monomer is an acrylic ester monomer.
- (Original) The polymer according to Claim 24 wherein the (meth)acrylic acid type monomer is a methacrylic ester monomer.

 (Original) The polymer according to Claim 25 wherein the acrylic ester monomer is butyl acrylate.

- (Previously presented) The polymer according to Claim 22 wherein its main chain is prepared by polymerizing a styrene type monomer.
- 29. (Previously presented) The polymer according to Claim 22, wherein a ratio (Mw/Mn) of its weight average molecular weight (Mw) to number average molecular weight (Mn) as determined by gel permeation chromatography is not over 1.8.
- (Previously presented) The polymer according to Claim 22, wherein its number average molecular weight ranges from 500 to 100000.
- 31-37 (Canceled).

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38. (Currently amended) A method for preparing the vinyl polymer having an alkenyl group at a terminus of its main chain according to Claim 13, which comprises polymerizing a vinyl monomer to obtain a vinyl polymer having a group of the following general formula (7) at at least one terminus of its main chain, and substituting an alkenyl-containing carbanion of the following general formula (10) for the terminal halogen of said polymer:

$$-CH_2-C(R^1)(R^2)(X)$$
 (7)

wherein R<sup>1</sup> and R<sup>2</sup> are same or different, and each represents a hydrogen atom or a univalent organic group and X represents chlorine, bromine, or iodine;

$$M^+C^-(R^6)(R^7)-R^8-C(R^9)=CH_2$$
 (10)

wherein  $R^6$  and  $R^7$  each represents an electron-withdrawing group or one of them represents an electron-withdrawing group with the other representing hydrogen, an alkyl group having 1 to 10 carbon atoms, or phenyl;  $R^8$  represents a direct bond or a divalent organic group having 1 to 10 carbon atoms and optionally containing one or more ether bonds;  $R^9$  represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an

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aralkyl group having 7 to 10 carbon atoms; M<sup>+</sup> represents an alkali metal ion or a quaternary

- (Original) The method according to Claim 38 wherein M<sup>+</sup> represents sodium ion or potassium ion.
- 40. (Previously presented) The method according to Claim 38 wherein said vinyl monomer is polymerized using an organohalogen compound or a sulfonyl halide compound as an initiator and a transition metal complex as an catalyst.
- 41. (Original) The method according to Claim 40 wherein the transition metal complex is a complex of one metal selected from the group consisting of copper, nickel, ruthenium and iron.
- (Original) The method according to Claim 41 wherein the transition metal complex is a complex of cooper.
- (Previously presented) The method according to Claim 38 wherein said vinyl monomer is polymerized using a chain transfer agent.
- 44. (Currently amended) A method for preparing the vinyl polymer having a crosslinkable silyl group at a terminus of its main chain according to Claim 22, which comprises polymerizing a vinyl monomer to obtain a vinyl polymer having a group of the following general formula (7) at at least one terminus of its main chain, and substituting a crosslinkable silyl-containing carbanion of the following general formula (11) for a terminal halogen of said polymer;

 $-CH_2-C(R^1)(R^2)(X)$  (7)

wherein R<sup>1</sup> and R<sup>2</sup> are the same or different, and each represents a hydrogen atom or a univalent organic group and X represents chlorine, bromine, or iodine;

$$M^{+}C^{-}(R^{6})(R^{7})-R^{8}-CH(R^{9})-CH_{2}-[Si(R^{10})_{2-b}(Y)_{b}O]_{m}-Si(R^{11})_{3-a}(Y)_{a}$$
(11)

wherein R<sup>6</sup> and R<sup>7</sup> are the same or different, and each represents an electron-withdrawing group or one of them represents an electron-withdrawing group with the other representing hydrogen, Application No. 10/763,268 Docket No.: 21581-00160-US3

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an alkyl group having 1 to 10 carbon atoms, or phenyl; R<sup>8</sup> represents a direct bond or a divalent organic group having 1 to 10 carbon atoms and optionally containing one or more ether bonds; R<sup>9</sup> represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms; R<sup>10</sup> and R<sup>11</sup> are the same or different, and each represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an aralkyl group having 7 to 20 carbon atoms, or a triorganosiloxy group of the formula (R')<sub>2</sub>SiO- (R' represents a univalent hydrocarbon group of 1 to 20 carbon atoms and three R's are the same or different) and when two or more R<sup>10</sup> or R<sup>11</sup> occur, they are the same or different; Y represents hydroxyl or a hydrolyzable group and when two or more Y occur, they are the same or different; a represents 0, 1, 2, or 3; b represents 0, 1, or 2; m represents an integer of 0 to 19, provided that a+mb≥1; M<sup>+</sup> represents an alkali metal ion or a quaternary ammonium ion

- (Original) The method according to Claim 44 wherein M<sup>+</sup> represents sodium ion or potassium ion.
- 46. (Previously presented) The method according to Claim 44 wherein said vinyl monomer is polymerized using an organohalogen compound or a sulfonyl halide compound as an initiator and a transition metal complex as a catalyst.
- 47. (Original) The method according to Claim 46 wherein the transition metal complex is a complex of one metal selected from the group consisting of copper, nickel, ruthenium and iron.
- 48. (Original) The method according to Claim 47 wherein the transition metal complex is a complex of copper.
- (Previously presented) The method according to Claim 44 wherein said vinyl monomer is polymerized using a chain transfer agent.
- (Canceled)

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51. (Previously presented) A curable composition comprising (a) the vinyl polymer having an alkenyl group of the following general formula (1) at a terminus of its main chain:

$$-CH_2-C(R^1)(R^2)-O-R^3-C(R^4)=CH_2$$
 (1)

wherein R<sup>1</sup> and R<sup>2</sup> are the same or different, and each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the production of a main chain of the polymer; R<sup>3</sup> represents a divalent organic group having 1 to 20 carbon atoms and optionally containing one or more ether or ester bonds; R<sup>4</sup> represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms), and (b) a hydrosilyl-containing compound.

- (Original) A curable composition comprising, as a principal component, the vinyl
  polymer having a crosslinkable silyl group at a terminus of its main chain according to Claim 12.
- 53. (Previously presented) A curable composition comprising (a) the vinyl polymer having an alkenyl group at a terminus of its main chain according to Claim 13 and (b) a hydrosilylcontaining compound.
- 54. (Previously presented) A curable composition comprising, as a principal component, the vinyl polymer having a crosslinkable silyl group at a terminus of its main chain according to Claim 22.
- 55. (Currently Amended) A method for preparing the vinyl polymer having a crosslinkable silyl group at a terminus of its main chain according to claim 12 which comprises adding a hydrosilane compound having a crosslinkable silyl group of the following general formula (9):

$$H-[Si(R^{10})_{2-b}(Y)_bO]m-Si(R^{11})_{3-a}(Y)_a$$
 (9)

wherein R<sup>10</sup> and R<sup>11</sup> are the same or different, each represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an aralkyl group having 7 to 20 carbon atoms, or a triorganosiloxy group of the formula (R')<sub>3</sub>SiO-, wherein R' represents a univalent hydrocarbon group of 1 to 20 carbon atoms and three R's are the same or different and

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when two or more  $R^{10}$  or  $R^{11}$  occur, they are the same or different; Y represents hydroxyl or a hydrolyzable group and when two or more Y occur, they are the same or different; a represents 0, 1, 2, or 3; b represents 0, 1, or 2; m represents an integer of 0 to 19, provided that  $a+mb\ge 1$ 

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to a vinyl polymer having an alkenyl group of the following general formula (1) at  $\underline{at}$  least one terminus of its main chain:

$$-CH_2-C(R^1)(R^2)-O-R^3-C(R^4)=CH_2$$
 (1)

wherein R<sup>1</sup> and R<sup>2</sup> are the same or different, and each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the production of a main chain of the polymer; R<sup>3</sup> represents a divalent organic group having 1 to 20 carbon atoms and optionally containing one or more ether or ester bonds; R<sup>4</sup> represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms.

56. (Currently Amended) A method for preparing the vinyl polymer having a crosslinkable silyl group of the following formula (6) at at least a terminus of its main chain:

 $-CH_2-C(R^1)(R^2)-C(R^6)(R^7)-R^8-CH(R^9)-CH_2-[Si(R^{10})_{2-b}(Y)_bO]m-Si(R^{11})_{3-a}(Y)_a$  (6)

wherein R<sup>1</sup> and R<sup>2</sup> are the same or different, each represents a hydrogen atom or a univalent organic group derived from the group bound to a vinyl group of a vinyl monomer used for the production of a main chain of the polymer; R<sup>6</sup> and R<sup>7</sup> are the same or different, each represents an electron-withdrawing group or one of them represents an electron-withdrawing group with the other representing hydrogen, an alkyl group having 1 to 10 carbon atoms, or phenyl; R<sup>8</sup> represents a direct bond or a divalent organic group having 1 to 10 carbon atoms and optionally containing one or more ether bonds; R<sup>9</sup> represents hydrogen, an alkyl group having 1 to 10 carbon atoms, an aryl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms; R<sup>10</sup> and R<sup>11</sup> are the same or different, each represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an aralkyl group having 7 to 20 carbon atoms, or a triorganosiloxy group of the formula (R<sup>1</sup>)<sub>3</sub>SiO· (R<sup>1</sup>)<sub>3</sub>SiO·, wherein R<sup>1</sup> represents a univalent hydrocarbon group of 1 to 20 carbon atoms and the three R<sup>1</sup>s are the same or different and when two or more R<sup>10</sup> or R<sup>11</sup> occur, they are the same or different; Y represents hydroxyl or a hydrolyzable group and when two or more Y occur, they are the same or different:

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a represents 0, 1, 2, or 3; b represents 0, 1, or 2; m represents an integer of 0 to 19, provided that a+mb≥1; which comprises adding a hydrosilane compound having a crosslinkable silyl group of the following general formula (9):

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$$H-[Si(R^{10})_{2-b}(Y)_bO]m-Si(R^{11})_{3-a}(Y)_a$$
 (9)

wherein  $R^{10}$  and  $R^{11}$  are the same or different, each represents an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 atoms, an aralkyl group having 7 to 20 carbon atoms, or a triorganosiloxy group of the formula  $(R')_3SiO^-$ , wherein R' represents a univalent hydrocarbon group of 1 to 20 carbon atoms and three R's are the same or different and when two or more  $R^{10}$  or  $R^{11}$  occur, they are the same or different; Y represents hydroxyl or a hydrolyzable group and when two or more Y occur, they are the same or different; a represents 0, 1, 2, or 3; b represents 0, 1, or 2; m represents an integer of 0 to 19, provided that  $a+mb\ge 1$ 

to the vinyl polymer having an alkenyl group at at least one terminus of it main chain according to claim 13.